Mitigation Plan for the Legacy Nature Preserve

Draft Wetlands Mitigation Plan

Legacy Parkway Project

October 2005

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To compensate for impacts to wetland and wildlife resources from the proposed Legacy Parkway, the Utah Department of Transportation (UDOT) is implementing the preservation, restoration/enhancement, and creation of wetlands and upland buffers within the 2,100-acre Legacy Nature Preserve (Preserve or LNP).

An addendum to the mitigation plan presented in the 2000 Final EIS was approved by the U.S. Army Corps of Engineers in April 2001. This updated mitigation plan (2005) has been prepared for the Supplemental EIS and revised to be consistent with recent Corps "Mitigation and Monitoring Proposal Guidelines" (December 30, 2004). This plan has also been updated to present current mitigation requirements and goals and to provide a current status update on the implementation, monitoring, and reporting of mitigation requirements. Additionally, this plan provides an overview of the current goals and objectives currently being developed by the Preserve's Collaborative Design Team (CDT). The CDT is preparing the adaptive management plan within the framework of the mitigation plan and 404 permit requirements.

This report does not analyze the adequacy of proposed mitigation. The adequacy of proposed mitigation to compensate for both wetland and wildlife impacts identified in the Supplemental EIS is analyzed and described in detail in appendix E of the Supplemental EIS.

1.0 Introduction

The proposed Legacy Parkway is a four-lane, restricted-access, divided highway that extends approximately 14 miles from Interstate 215 (I-215) at 2100 North in Salt Lake City, Utah, northward to Interstate 15 (I-15) and U.S. Highway 89 (US 89) near Farmington, Utah. Planning for wetlands mitigation to compensate for impacts from the Parkway began in the 1990s. In 1997, most state and federal resource agencies agreed on the concept of creating a preserve to the west of the proposed Parkway. The mitigation design for the Legacy Nature Preserve has been developed and revised through the following steps:

- Initially, during the preparation of the Draft Environmental Impact Statement (EIS) for the Legacy Parkway, the Preserve was planned at a size of 1,251 acres. This amount of land was determined using functional assessment models based on the hydrogeomorphic (HGM) approach initially developed by Brinson (1993).
- Next, 317 acres adjacent to the Farmington Bay Waterfowl Management Area were added during the preparation of the Final EIS to mitigate for impacts to wildlife that the U.S. Fish and Wildlife Service (USFWS) felt were not captured by the original 1,251 acres.
- A mitigation plan was presented in the Legacy Parkway 2000 Final EIS (Appendix B3) that included both the original 1,251 acres and the additional 317 acres of mitigation properties.
- Following publication of the Final EIS, 530 acres were added to the Preserve during the preparation of the Records of Decision from the U.S. Army Corps of Engineers (Corps) and the Federal Highway Administration (FHWA). These parcels addressed concerns raised by the Environmental Protection Agency (EPA).
- In January 2001, the Corps granted a Section 404 individual permit to fill 114 acres of wetlands. This permit outlines extensive mitigation requirements. UDOT has since modified the Parkway design to reduce impacts. The proposed Parkway right-of-way has been narrowed from 328 feet to 312 feet and contains 113 acres of wetlands. The Parkway footprint within right-of-way has been designed to further reduce direct wetland impacts from 113 acres to 103 acres.
- In April 2001, an addendum to the 2000 Final EIS Mitigation Plan was approved by the Corps. The addendum plan addressed mitigation requirements from the 404 permit and presented a revised mitigation plan

for the entire 2,100-acre Legacy Nature Preserve. (The calculated areas from parcel descriptions totaled 2,098 acres, but geographic information system [GIS] data currently show the Preserve to be 2,105 acres. This report refers to the Preserve as encompassing 2,100 acres.)

This area of 2,100 acres as described above is currently proposed by UDOT as the Legacy Nature Preserve, which has been developed as mitigation for direct and indirect impacts to wetlands and wildlife from the construction of the proposed Legacy Parkway (see Figure 4-1, Site Location Map, and Figure 4-2, Legacy Nature Preserve). Mitigation, monitoring, and reporting activities detailed in the 404 permit and addendum plan began in 2001 and have continued despite the legal injunction that halted construction of the Parkway. In January of 2005, UDOT established a Collaborative Design Team (CDT) to provide recommendations to the Corps for adaptive and long-term management options for the Preserve.

1.1 Objectives

The principal objectives of this updated mitigation plan are as follows:

- Present current mitigation requirements and goals consistent with Corps "Mitigation and Monitoring Proposal Guidelines" (December 30, 2004).
- Provide a current status update on the implementation, monitoring, and reporting of mitigation requirements. Further details regarding mitigation activities are provided in annual status reports required by the 404 permit. Annual status reports for the following years have been submitted to the Corps: 2001, 2002, 2003, and 2004.
- Provide an overview of the current goals and objectives currently being developed by the CDT through a collaborative planning process to prepare an adaptive management plan for the preserve. The CDT is preparing the adaptive management plan within the framework of the mitigation plan and 404 permit requirements. The CDT has developed the following mission statement for the Preserve:

  "The Legacy Nature Preserve provides in perpetuity quality wildlife habitats for the purpose of mitigating impacts to wetlands and wildlife associated with the Legacy Parkway."

This mitigation plan does not discuss the adequacy of proposed mitigation. An "Analysis of the Adequacy of Wetlands and Wildlife Mitigation" is presented in Appendix E of the Legacy Parkway Supplemental EIS. Information regarding the wetlands functional assessment based on the HGM approach that was used to

help determine appropriate mitigation is provided in Appendix D of the Supplemental EIS.

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2.0 Project Requiring Mitigation

The proposed Legacy Parkway and the mitigation site known as the Legacy Nature Preserve (Preserve) are both located within the project study area. Figure 4-1, Site Location Map, provides the site location of both the project area and the adjacent mitigation site for the Preserve.

2.1 Project Site Location

UDOT is proposing to build the Legacy Parkway, which would extend approximately 14 miles from I-215 at 2100 North in Salt Lake City, Utah, northward to I-15 and US 89 near Farmington, Utah. This location is within both Salt Lake County and Davis County as shown in Figure 4-1, Site Location Map.

2.2 Project Description

The Parkway would be a four-lane, restricted-access, divided highway. A multiple-use trail for pedestrians, bicyclists, and equestrians would parallel the highway.

The Parkway right-of-way contains 113 acres of jurisdictional wetlands. However, only 103 acres would be impacted by the highway footprint.

2.3 Site Characteristics of Project Area Requiring Mitigation

Many general characteristics of the project area are similar to the characteristics of the Mitigation area. The project area and surrounding project study area (including the mitigation site) is located within the Great Salt Lake ecosystem adjacent to the southeast shore of the Great Salt Lake. Unique features of this shallow, saline lake produce abundant brine shrimp and brine fly resources. These resources, along with a mosaic of adjacent wetland complexes, make the Great Salt Lake an internationally significant site for millions of migratory birds each year.

Much of the area east of the lake has been disturbed by agricultural practices including heavy livestock grazing since the mid-1800s. Urban development began on higher elevations between the Great Salt Lake ecosystem to the west and the foothills of the Wasatch Mountains to the east. This development continues to spread eastward into the mountains and westward farther into the Great Salt Lake ecosystem. Currently, open space in Davis County is being developed at the rate of about 280 hectares (700 acres) per year (Sommerkorn

2004), and much of this development is located within the Great Salt Lake ecosystem.

The proposed Parkway right-of-way lies on the western edge of dense urban areas (residential and industrial) and generally passes through pasturelands, some developed areas, and undeveloped areas that are generally heavily disturbed and degraded. The Legacy Parkway forms the eastern boundary of the mitigation site in several locations (see Figure 2, Legacy Nature Preserve). Resource information specific to the project area (that is, the Legacy Parkway right-of-way) is described in the sections below.

2.3.1 Jurisdictional Areas

The existing wetlands within the project area and surrounding project study area are part of the Great Salt Lake ecosystem. These wetlands and the uplands surrounding the wetlands act as a buffer between the Great Salt Lake to the west and intense development to the east. Many of the wetlands have been degraded by multiple human activities. The relative condition of these wetlands was evaluated using functional assessment models based on the HGM approach (described in Section 2.3.2).

The seven wetland vegetation cover types in the project study area are forested, shrub-scrub, marsh, wet meadow, playa, unconsolidated shore, and open water. Appendix D of the Supplemental EIS provides a description of each wetland cover type.

Although the Parkway right-of-way contains 113 acres of jurisdictional wetlands, only 103 acres would be directly impacted. For purposes of the mitigation analysis, it was assumed that all wetlands within the right-of-way would be directly impacted. The functional assessment also assumed that wetlands within 1,000 feet of the right-of-way would be indirectly affected. Table 2-1 provides an overview of wetland impacts for UDOT's proposed alternative (Alternative E).

Table 2-1. Wetland Cover Types Impacted by Parkway

Wetland Type	Alternative E Impacts (acres)	
	Direct [a]	Indirect
Forested Wetland	0	0
Shrub-Scrub	0	0
Marsh	24	102
Wet Meadow	65	306
Playa	18	68
Unconsolidated Shore	0	47
Open Water	7	50
Total	**113**	**595**

[a] Values are rounded to the nearest whole number. Summing values would equal 114 acres, however 113 acres is accurate.

2.3.2 Wetland Functions

Impacts from the Parkway to wetland functions were calculated using functional assessment models that were developed for the project based on the hydrogeomorphic (HGM) approach. The HGM approach is a procedure for measuring the capacity of a wetland to perform various functions. HGM allows quantification of both direct and indirect impacts to wetland functions. That is, the HGM approach can quantify the loss of function for wetlands filled, and the partial loss of function of wetlands that will be located next to the proposed project once it is built. The Legacy wetlands functional assessment team developed low-resolution models based on the HGM approach in which wetland basins were delineated and classified into three broad wetland classes (or HGM categories):

- **Basin depressional**. The hydrology of basin depressional wetlands generally enters via surface water runoff, is detained in a closed basin and primarily leaves through evaporation.
- **Groundwater slope**. Slope wetlands are supported by hydrology originating from springs, seeps and / or high groundwater and have an elevated inlet with a downward, horizontal flow.
- **Lacustrine fringe.** Lacustrine wetlands are located near the Great Salt Lake and receive hydrologic support from the lake.

Each of the three HGM classes can support the same wetland cover types (e.g. marsh, wet meadow, etc.) depending on factors such as the depth and duration of hydrology. As shown in Table 2-2, these wetlands perform many different functions.

Table 2-2. HGM Wetland Functions (FCUs)

Function	Groundwater Slope	Basin Depressional	Lacustrine Fringe
Hydrology			
Surface Water Detention and Storage	–	+	+
Maintain Wetland Hydrology	+	+	+
Energy Dissipation	–	–	+
Biogeochemistry			
Particulate Retention	–	+	–
Elements/Compounds Retention, Conversion, and Release	+	+	+
Net Organic Compound Accumulation and Element Cycling	+	+	+
Organic Carbon Export	+	–	+
Flora and Fauna Habitat Support			
Maintain Characteristic Vegetation	+	+	+
Maintain Characteristic Invertebrate Food Webs	+	+	+
Maintain Characteristic Vertebrate Habitats	+	+	+
Maintain Landscape-Scale Biodiversity	+	+	+
Maintain Habitat Interspersion and Connectivity	+	+	+

Notes:
+ Carries out function
– Does not carry out function to a substantial degree
Source: Appendix D of the Supplemental EIS

Based on the functions in Table 2-2 and available information on implementing the HGM approach, an interagency functional assessment team for the project developed models to describe the following five functions:

1. Maintain Wetland Hydrology
2. Removal of Dissolved Elements and Compounds
3. Particulate Retention
4. Habitat Structure
5. Habitat Connectivity, Fragmentation, Patchiness

These five assessment model functions are described in detail in Appendix D of the Supplemental EIS. Impacts from the Parkway to these wetland functions were calculated with the assessment models. The results are presented in Table 2-3.

Table 2-3. Wetland Impacts by Functional Capacity Units (Total FCUs Impacted)

Wetland Type	FCU 1 (Maintain Wetland Hydrology)	FCU 2 (Removal of Dissolved Elements and Compounds)	FCU 3 (Particulate Retention)	FCU 4 (Habitat Structure	FCU 5 (Habitat Connectivity, Fragmentation, Patchiness)
Basin Depressional	53	53	56	32	51
Groundwater Slope	30	30	24	27	32
Lacustrine Fringe	67	45	46	40	47

According to the results in Table 2-3, all functions would be impacted by the project and the extent of these impacts varies by wetland class. The project tends to impact the hydrology function (Function 1) more than other functions because the model considers a four-lane paved roadway to be a major barrier that can disrupt of impair the hydrology of a wetland. The results in Table 2-3 above represent a worst-case scenario because the functional assessment models assumed all wetlands within the right-of-way would be filled and they did not incorporate significant project mitigation measures (such as vegetated filter strips to improve stormwater runoff water quality and equalization culverts to maintain hydraulic connectivity across the Parkway) to minimize or avoid indirect impacts. Appendix E of the Supplemental EIS provides additional information on impacts to wetland functions.

2.3.3 Hydrology / Soils / Topography and Wildlife Habitat / Vegetative Cover

The following hydrological sources in the project study area sustain wetlands:

- Shallow water table (groundwater)
- Small tributaries to Jordan River and Great Salt Lake
- Irrigation ditches and canals
- Storm event runoff
- Snowmelt
- Direct precipitation
- Agricultural runoff
- Fluctuations in Great Salt Lake surface elevation
- Jordan River

The wetlands in the project area and surrounding study area are located near the bottom of a closed Great Salt Lake U.S. Geological Survey (USGS) watershed (Cataloging Unit: 16020310). Water flows into the system via rivers, intermittent

and perennial streams, and groundwater. The hydrology of the Jordan River is largely controlled by outlet facilities at Utah Lake and diversion structures along its 50-mile course to the Great Salt Lake. The major diversion structure on the Jordan River is the Surplus Canal Diversion, located at about 2100 south in Salt Lake City. The Surplus Canal is a deep, wide canal that diverts a portion of the Jordan River's flow across the less-populated northwest quadrant of Salt Lake City and conveys water to managed wetlands, agricultural lands, and the Great Salt Lake.

According to the preliminary results of a piezometer study described in Section 4.10 of the Supplemental EIS, the groundwater that supports wetlands in the study area is derived largely from the vertical flow of water from deeper aquifers. Irrigation, other surface waters, and precipitation are secondary sources of hydrology for the shallow groundwater table.

Topography within the project area and throughout the project study area is very gentle. A typical degree of slope within the mitigation area is about 10 to 15 feet of elevation change for every linear mile, which leads to very shallow slope ratios. The shallow slope ratios result in slow hydrologic flows, which allow pollutants to settle out of the water flow, volatilize, and be absorbed by vegetation.

Soils near the Jordan River floodplain in the southeast portion of the study area are predominantly Logan silty clay loam. A small portion of the eastern portion of the floodplain is composed of the Arave-Saltair complex (NRCS 1968). Both of these soil-mapping units are alkaline, are poorly to very poorly drained, and have a shallow water table.

Soils located higher than and farther east of the Jordan River and Great Salt Lake floodplains are generally deep and somewhat poorly to very poorly drained Also, because they formed on low lake terraces, these soils are affected by salts and alkali. Soil permeability is generally slow. Soil series present are Warm Springs, Payson, Airport, Arave, and Saltair (NRCS 1968). All of these soil series are hydric soils, except for Warm Springs.

Vegetation communities within the project area and surrounding study area have been characterized and classified to delineate broad habitat types for wildlife use. Wetland communities as defined for wildlife use are predominantly hydric meadow, sedge/cattail, and mudflat/pickleweed. A few areas are classified as open water. Limited riparian areas occur in sparsely distributed patches along stream corridors (in jurisdictional and non-jurisdictional areas).

Note that the habitat classifications are similar to the wetland cover types presented for jurisdictional wetlands (Section 2.1.1) with a few differences:

jurisdictional wetlands classified as forested or shrub-scrub were classified for wildlife use as riparian habitat, and unconsolidated shore wetlands were classified for wildlife use as either riparian or open water. Jurisdictional wet meadows were classified as hydric meadows, playas were classified as mudflat/pickleweed, and marsh wetlands were classified within the sedge/cattail community. Differences are discussed in greater detail in Appendix B of the wildlife technical memorandum.

Uplands consist of pasture, cropland, and salt desert scrub habitats. Many noxious and invasive species are common to the study area and are dominant in disturbed areas. Descriptions of the vegetation community types identified in the project area are provided below.

Hydric Meadow

Hydric meadows are located throughout the project study area, are mainly somewhat saline, and are not perennially inundated or saturated. Under these conditions, saltgrass (*Distichlis spicata*) is the dominant plant species, followed by little barley (*Hordeum pusillum*) and foxtail barley (*Hordeum jubatum*).

A few hydric meadows are less saline and are supported by a greater hydrologic flow. Dominant species in these areas include wiregrass (*Juncus balticus*), Nuttail's alkali grass (*Pucinellia nuttailiana*), sedge mouse-tail (*Myosurus aristatus*), foxtail barley, and creeping spikerush (*Eleocharis palustris*). Salt cedar (*Tamarix ramosissima*) and purple loosestrife (*Lytrum salicaria*) have also invaded many hydric meadows in the project study area.

Sedge/Cattail

Sedge/cattail communities occur intermittently with hydric meadows and playas in the Jordan River floodplain, and sedge/cattail habitat becomes more common to the west of Centerville in the northwest part of the project study area. The dominant vegetation species found in emergent marshes are broad-leaf cattail (*Typha latifolia*), hardstem bulrush (*Scirpus acutus*), alkali bulrush (*Scirpus maritimus*), and common reed (*Phragmites australis*).

Mudflat/Pickleweed

Mudlflat/pickleweed habitat is common in the lower (western) parts of the project study area, mainly below 4,212 feet in elevation. Within most playas, pickleweed (*Salicornia europaea*) is dominant. Iodine bush

(*Allenrolfea occidentalis*), saltgrass, and little barley occur along some playa fringes, depending on soil salinity. There are some alkaline playas located at slightly higher elevations (4,216 to 4,220 feet). These playas are dominated by western seepweed (*Suaeda occidentalis*) and may also contain iodine bush, pickleweed, little barley, and saltgrass.

Open Water

Some open water habitats in the project study area are not true wetlands, but were delineated as jurisdictional waters of the U.S. Other open water areas that are considered non-jurisdictional are features such as cement-lined, human-made ponds and canals. Aquatic vegetation is very limited in these areas.

Riparian

Riparian habitat has a limited occurrence in sparsely distributed patches along stream corridors across the project study area. The riparian areas along the Jordan River are greatly reduced and severely degraded by human activity compared to natural conditions. The river provides hydrology to support coyote willow (*Salix exigua*), fremont cottonwood (*Populus fremontii*), Russian olive (*Elaeagnus angustifolia*), salt cedar, Siberian elm (*Ulmus pumila*), cattails, hardstem bulrush, and common reed. Several streams run east to west across the study area and contain limited riparian habitat with similar species composition.

Pasture

Many pasturelands in the project study area were naturally salt desert scrub habitats that have been cleared of woody vegetation, generally above 4,212 feet in elevation. Some pastures have been planted with various pasture grasses, but noxious or invasive species have invaded and dominate many of these areas. Wheatgrass species (*Elymus* spp.) dominate some pasture lands, while the following noxious or invasive species are common to many pastures in the study area: Russian knapweed (*Acroptilon repens*), Scotch thistle (*Onopordum acanthium*), Canada thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), Dyer's woad (*Isatis tinctoris*), perennial pepperweed (*Lepedium latifolium*), curly cup gumweed (*Grindelia squarrosa*), kochia (*Kochia scoparia*), cheatgrass (*Bromus techtorus*), Japanese brome (*Bromus japonicus*), bulbous bluegrass (*Poa bulbosa*), broom snakeweed (*Gutierrezia sarothrae*), whitetop (*Cardaria draba*), bur buttercup (*Ranunculus testiculatus*), and storksbill (*Erodium cicutarium*).

Cropland

Many uplands throughout the project study area have been manipulated for agricultural purposes. Alfalfa (*Medicago sativa*) and wheatgrass species dominate several cultivated or once-cultivated areas. Noxious or invasive species similar to those found in pasturelands are common in feral croplands.

Salt Desert Scrub

Salt desert scrub habitat is the dominant natural upland community in the project study area. Where these areas have not been converted to croplands or heavily manipulated pastures, scrub communities are common within the study area from 4,212 to 4,220 feet. Dominant species in this community include greasewood (*Sarcobatus vermiculatus*), iodine bush, saltbush (*Atriplex* spp.), saltgrass, and barley. Noxious or invasive species similar to those found in pasturelands also occur in this habitat, but to a lesser extent in relatively undisturbed areas.

Each of the wildlife habitat types delineated by vegetative cover in the project study area would be impacted by the Legacy Parkway. Table 2-4 provides the area of direct habitat loss for each community type.

Table 2-4. Habitats in Project Area (Legacy Parkway right-of-way)

Wildlife Habitat Type	Alternative E (acres)
Wetland Complex/Riparian Habitats	
Hydric meadow	75.6
Sedge/Cattail	24.2
Mudflat/Pickleweed	16.3
Open Water	9.6
Riparian	3.8
Total Wetland Complex/Riparian Habitat	*129.5*
Upland Habitats	
Pasture	201.8
Cropland	129.3
Salt Desert Scrub	127.2
Total Upland Habitat	*458.3*
Developed Land	277.3

Wetland complex/riparian wildlife habitat is not categorized in the same manner as "jurisdictional wetlands" are (as defined in Draft Supplemental EIS Section 4.12, Wetlands). Wetland complex/riparian wildlife habitat includes jurisdictional areas as well as non-jurisdictional riparian areas and other mesic habitats. This difference is discussed in greater detail in Appendix B of the wildlife technical memorandum.

A total of 129.5 acres of wetland complex/riparian habitats would be impacted by the Parkway, consisting mostly of hydric meadow (75.6 acres), sedge/cattail (24.2 acres), and mudflat/pickleweed (16.3 acres). A total of 458.3 acres of upland habitats would be directly impacted, consisting of pasture (201.8 acres), cropland (129.3 acres), and salt desert scrub (127.2 acres). Additionally, 277.3 acres of developed land would be impacted.

3.0 Mitigation Design for the Legacy Nature Preserve

3.1 Basis for Design

Throughout the process of developing appropriate mitigation for impacts to wetland and wildlife resources from the proposed Legacy Parkway, the lead agencies, technical consultants, and resource agencies developed concepts for the Preserve. As described in Section 1.0, Introduction, the 2001 Corps 404 permit detailed mitigation requirements for the 2,100-acre Preserve. In January of 2005, UDOT established a Collaborative Design Team (CDT) to provide recommendations to the Corps for adaptive management goals and procedures to guide long-term management options for the Preserve. The Collaborative Design Team (CDT) has developed the following mission statement for the Preserve:

> *"The Legacy Nature Preserve provides in perpetuity quality wildlife habitats for the purpose of mitigating impacts to wetlands and wildlife associated with the Legacy Parkway."*

In order to fulfill this mission, the following primary mitigation objectives have been incorporated into the Preserve's mitigation package:

- **Preservation.** Open space in Davis County is being developed at the rate of about 280 hectares (700 acres) per year (Sommerkorn 2004). All mitigation properties would be purchased and deed restricted to protect wetland and upland habitats in perpetuity from encroaching development and to buffer adjacent areas important for wildlife in the Great Salt Lake ecosystem such as the Farmington Bay Waterfowl Management Area. Because of the threat of future development the importance of wetlands and uplands to the Great Salt Lake Ecosystem that are located west of Parkway alignment, preservation was favored over wetlands creation. Preservation accounts for about 30% of total mitigation credits calculated using the project's functional assessment models. The model calculations for determining the adequacy of mitigation are explained in detail in Appendix E of the Supplemental EIS.

- **Enhancement and Restoration.** Mitigation properties in the Preserve have been subject to years of human activities and disturbances (such as draining groundwater, filling wetland areas, dumping, flood irrigation, and grazing) that have caused extensive hydrologic alterations to and degradation of wetland and upland habitats. Enhancement and restoration measures would increase wetland functions in the Preserve and the overall productivity of wildlife habitats. The majority of the calculated mitigation credits are attributed to restoration measures (62%).
- **Creation.** After the Corps' Record of Decision was issued, UDOT and the Corps modified the mitigation plan and developed conceptual plans for drilling two artesian wells to create wetlands that would mitigate for the loss of groundwater-slope wetlands. The wetland functional assessment models were used to calculate the level of wetland function that would result from the creation of 12 acres of wetlands in which hydrology would be provided by the development of artesian flow. Relative to other mitigation components, very little credit has been calculated for wetlands creation (8% of total mitigation credits).

The Preserve lands are an integral part of the existing wetland and associated upland habitat complexes along the eastern shore of the Great Salt Lake that currently provide foraging, nesting, and staging habitat for millions of migratory waterfowl, shorebirds, and other wildlife each year. The preservation, enhancement/restoration, and creation of habitats within the Preserve would provide a regional benefit to wildlife. The Preserve would become a major link in the chain of protected ecological areas along the shoreline of the Great Salt Lake.

This plan provides a summary of the three quantitative methods used to compare impacts versus mitigation: wetland area (jurisdictional areas in acres), HGM functional capacity units (FCUs), and wildlife habitat/vegetative cover (in acres).

3.1.1 EIS Technical Reports

Several technical reports were completed to provide input into the mitigation planning process (see Appendix B3 of the 2000 Final EIS). Various types of data were collected to provide a better understanding of the Legacy Nature Preserve properties and the feasibility of various mitigation possibilities. UDOT conducted a jurisdictional wetland delineation of Preserve properties. Data were collected using aerial photography, ground surveys, and other means. Digital terrain modeling was utilized to portray Preserve topography and to develop contour maps with 0.25-meter intervals.

To ascertain Preserve hydrology, survey data were collected for 39 Jordan River cross-sectional profiles. Several sources of Jordan River discharge data were

evaluated for use. Records of the Utah Division of Water Rights of allocation of lower Jordan River surface water and project area groundwater were reviewed. Aerial photographs of the proposed Preserve area dating from 1965 to 1999 were reviewed.

Numerous alternatives for reconnecting the Jordan River with its floodplain on the Preserve were evaluated through in-depth hydraulic modeling and an accompanying report. Surface and subterranean drainage features on the Preserve were studied through field reconnaissance and study of aerial photos and field investigation using electromagnetometry.

3.2 Mitigation Site Location

The Legacy Nature Preserve (Preserve) is located within the Great Salt Lake ecosystem adjacent to the southeast shore of the Great Salt Lake and surrounding wetland complexes. The Preserve is located adjacent to and west of the proposed Legacy Parkway within the project study area near the southeast shore of the Great Salt Lake. Figure 4-1, Site Location Map, provides the Preserve (mitigation) site location, project area, and study area.

3.3 Mitigation Site Characteristics

The most common wetland types found within the project area are also common to the Preserve. The wetlands in the Preserve are similar in type and size to those found in the proposed Parkway right-of-way, but the Preserve contains larger areas of contiguous habitats in comparison to habitats fragmented by development that are more common to the project area.

The Preserve also contains important and unique ecological features such as relic channel meanders and oxbows that are remnants of Jordan River floodplain, a high-functioning wet meadow complex, and alkaline playas that are geomorphically unique to the region. In order to develop mitigation and management objectives that are specific to the respective ecological communities, the Preserve has been divided into five management areas (previous names are listed below in parentheses):

1. Riverine (Mini–Jordan River)
2. Evaporative Basins (Mini–Great Salt Lake)
3. Alkali Flats and Slope Wetlands (Upper Playas)
4. Wet Meadow – Corps Reference Wetland (HGM Wet Meadow)
5. Farmington Bay (Northern Properties)

Figure 3A and 3B, Legacy Nature Preserve Management Areas, shows the location of each the Preserve's five management areas. The following sections discuss characteristics specific to the Preserve and its five management areas.

3.3.1 Ownership Status

UDOT began purchasing properties designated for the Preserve in 2001. Prior to ownership by UDOT, the properties were owned by private citizens, local municipalities, and counties. UDOT is required to record a Covenant and Use Restriction with a Recorder of Deeds for all mitigation lands. These restrictions are outlined in the 2001 404 permit and include management of mitigation lands for wildlife, no discharge of dredged material or fill, no excavation, no alteration of vegetation, no vehicle access except as related to mitigation activities and maintenance, and no hydrologic modifications except as described in the mitigation or management plans for the Preserve, subject to approval by the Corps.

Since 2001, UDOT has acquired about 90% of all properties designated for mitigation and continues to work on acquiring the remaining parcels. UDOT has committed to the Corps that it will obtain the entire mitigation area in fee title. If UDOT determines that acquisition of any particular parcel is infeasible, UDOT could purchase alternative mitigation property subject to Corps approval.

3.3.2 Jurisdictional Areas

The 2,100-acre Preserve contains 778 acres of jurisdictionally delineated wetlands. As classified by the project's HGM-based categories, the Preserve contains 481 acres of lacustrine fringe wetlands, 157 acres of basin depressional wetlands, and 141 acres of groundwater slope wetlands. Table 3-1 provides wetlands in the Preserve as classified by vegetation cover type when field data were collected for the delineation in 1997.

Table 3-1. Jurisdictional Wetlands in the Preserve by Cover Types

Jurisdictional Areas	Acres (1997)[a]
Marsh	147
Wet Meadow	352
Playa	226
Unconsolidated Shore	48
Open Water	6
Total	**778**

[a] Values are rounded to the nearest whole number. Summing the values would equal 779 acres, however, 778 is accurate. This does not include the planned creation of 12 acres of slope wetlands using artesian wells or the 8 acres of wetlands physically restored by re-establishment, see Table 3-2.

As with the project study area and the Parkway right-of-way, wet meadow in the Preserve (352 acres) is the most common wetland cover type. The Preserve also contains a relatively large amount of playa wetlands (226 acres) and marsh wetlands (147 acres).

As described in Section 2.0, the proposed Legacy Parkway right-of-way contains 113 acres of jurisdictional wetlands. Table 3-2 compares potential wetland impacts in acres to wetlands in the Preserve, by each wetland vegetation cover type and according to different kinds of mitigation measures.

Table 3-2. Area Impacted Versus Mitigation (Acres)

Jurisdictional Areas	IMPACTS	MITIGATION				
	Direct Impacts [a]	Active Restoration [b]	Overall Restoration [c]	Creation	Re-establishment [d]	Mitigation Total [e]
Marsh	24	34	113	0	0	147
Wet Meadow	65	90	262	12	8	372
Playa	18	63	163	0	0	226
Unconsolidated Shore	0	0	48	0	0	48
Open Water	7	2	4	0	0	6
Total	**113**	**189**	**589**	**12**	**8**	**798**

[a] This analysis assumes that all wetlands within the Parkway right-of-way would be filled.

[b] Active restoration encompasses measures such as modifications to hydrology (for example, restoring water to the Jordan River floodplain, filling in drainage ditches, and relocating artesian wells to restore wetland hydrology).

[c] Overall restoration includes measures implemented throughout the Preserve such as site protection (external fencing), control of noxious / invasive species, removal of trash and debris, and removal of land uses such as livestock grazing to manage lands for wildlife.

[d] Re-establishment on the Preserve consists of removing fill material at several dump sites resulting in rebuilding former wetlands to yield a gain of wetland acres.

[e] Values are rounded to the nearest whole number. Summing the values in the impacts column would equal 114 acres, 113 acres is correct. Similarly, summing the values in the Mitigation Total column would equal 799 acres, however, 798 is accurate.

Within the Preserve, 778 acres (the sum of total Active Restoration plus Overall Restoration) of delineated jurisdictional wetlands would be preserved and restored. Active restoration includes measures such as modifications to hydrology. Overall restoration encompasses measures implemented throughout the Preserve. An additional 8 acres of wetlands (mapped without jurisdictional determination) have been physically reestablished by removing dumpsites and fill material and 12 acres are accounted for by creation measures. All of these different kinds of mitigation are described further in Section 3.4, Mitigation Goals and Objectives. The additional 20 acres plus the original 778 acres total to 798 acres of wetlands mitigation. Actual direct impacts for Alternative E would be 103 acres (113 acres in the right of way). The area ratio of total mitigation wetlands (798 acres) to direct wetlands impacted (103 acres) is 7.7:1.

3.3.3 Wetland Functions

To provide baseline information regarding wetland functions in the Preserve, the functional assessment models were used to calculate the existing conditions of Preserve wetlands in terms of functional capacity units. The baseline calculations provided in Table 3-3 were performed in 2001 prior to implementing mitigation measures.

Table 3-3. Baseline Conditions of Preserve Wetland Functions by Functional Capacity Units (FCUs)

HGM Category	Acres	Function 1 (Maintain Wetland Hydrology)	Function 2 (Removal of Dissolved Elements and Compounds)	Function 3 (Particulate Retention)	Function 4 (Habitat Structure)	Function 5 (Habitat Connectivity, Fragmentation, Patchiness)
Depressional	157	122	121	135	93	106
Slope	141	142	106	118	125	133
Lacustrine Fringe	481	336	363	305	238	261

Within each wetland class, the quality of each function varies. On a functional rating scale that ranged from low to high relative to existing functional quality of study area wetlands, about half of the wetlands in the Preserve were rated medium and nearly half of the remaining wetlands were rated high-to-medium. A few wetlands were rated either low or high. As shown in Table 3-3 above, the majority of FCUs in the Preserve were calculated for wetlands classified as lacustrine fringe, mainly because there are more acres of this class of wetland than other HGM-based classes. Appendix D and Appendix E of the Supplemental EIS discuss wetland functions for the study area and the Preserve in greater detail.

To generate mitigation credits (in FCUs), the effects of proposed mitigation measures were quantified as the amount of improvement from baseline conditions for wetland functions in the Preserve. Table 3-4 compares FCUs calculated for impacts versus mitigation FCUs.

Table 3-4. Comparison of FCUs by HGM Function and Category – Total FCUs Impacted (Preserve FCU Mitigation Credits)

Wetland Type	Function 1	Function 2	Function 3	Function 4	Function 5
Basin Depressional	53 (32)	53 (33)	56 (43)	32 (69)	51 (59)
Groundwater Slope	30 (35)	30 (36)	24 (53)	27 (48)	32 (47)
Lacustrine Fringe	67(105)	45 (105)	46 (133)	40 (249)	47 (174)

Through mitigation, the wildlife habitat function (Function 4) received the most benefit. This is because the other functions in the Preserve are in a relatively higher functioning condition and therefore cannot be improved as much. Additional discussion of functional assessment units in Table 3-4 is provided in Appendix E of the Supplemental EIS.

3.3.4 Hydrology / Topography and Wildlife Habitat / Vegetative Cover

Throughout the project study area including the Preserve, shallow groundwater is the principal hydrologic source to sustain wetlands. About 700 acres of the 2,100-acre Preserve lie within the 100-year Federal Emergency Management Agency (FEMA) floodplain elevation for the Great Salt Lake (4,212 feet) and flooding is also an infrequent source of water for area wetlands. A Great Salt Lake inundation analysis for the Preserve is provided in Section 3.0 of Appendix E of the Supplemental EIS. The 2,100-acre Preserve consists of a mosaic of different upland and wetland vegetation communities that provide habitat for a variety of wildlife species. Specific baseline characteristics of the Preserve for each of the five management areas are described below.

Riverine (Mini–Jordan River)

The Riverine management area (MA) is 204 acres in size and is located in the southwest part of the Preserve adjacent to the Jordan River and within the river's historic floodplain (see Figure 3, Legacy Nature Preserve Management Areas). Prior to extensive modifications to the river (such as dikes, diversions, and channelization), the Jordan River within this area was a sinuous, meandering stream with low bed slopes, low channel energy, fine-grained and cohesive bank materials, a fine-grained bedload, and low lateral migration rates (Inter-Fluve 1999). Currently, this reach of the Jordan River is aggrading and has been dredged periodically; dredging was last performed by Davis County in 1990 (Smith 1998). The historic processes driven by flood/scour, fluvial dynamism, and sedimentation rarely occur at the present time. The river no longer floods naturally into the relic channel meanders and oxbows throughout this MA, but water has periodically collected in these channels from surface runoff, irrigation tail water and back-flooding of the State Canal (which is diverted from Jordan River near the northern limits of the evaporative basins management area).

This MA mainly lies below the FEMA floodplain designation for the Great Salt Lake (4,212 feet) and is thereby subject to inundation from the Great Salt Lake when the lake level approaches historically high water levels.

The diversity of vegetation communities in the Riverine MA is evidence of a naturally dynamic system. This MA includes wetland complex/riparian communities such as hydric meadow, sedge/cattail, riparian, and mudflat/pickleweed. Upland communities are predominantly salt desert scrub with some pasturelands.

Common plant species in the hydric meadows are saltgrass (*Distichlis spicata*), little barley (*Hordeum pusillum*), and foxtail barley (*Hordeum jubatum*).

The historic river channels are dominated by sedge/cattail communities. The dominant vegetation species are alkali bulrush (*Scirpus maritimus*), hardstem bulrush (*Scirpus acutus*), alkali bulrush (*Scirpus maritimus*), broad-leaf cattail (*Typha* latifolia), and common reed (*Phragmites australis*). Some parts of the floodplain channels are dominated by pickleweed, common cocklebur (*Xanthium strumarium*), or curly dock (*Rumex crispus*).

Within the mudflat/pickleweed habitats, pickleweed (*Salicornia europaea*) is dominant and occurs throughout the playas (mudflats) or along fringes, depending on soil salinity and hydrology. Saltgrass and iodine bush (*Allenrolfea occidentalis*) also occur along fringes.

The woody riparian areas along the Jordan River in this MA are presently minimal but limited areas contain vegetation similar to that in riparian habitat throughout the study area: coyote willow (*Salix exigua*), Russian olive (*Elaeagnus angustifolia*), salt cedar (*Tamarix ramosissima*), and Siberian elm (*Ulmus pumila*).

Salt desert scrub habitats vary in quality within the Riverine MA. Some patches are heavily vegetated with native shrubs and few exotics, while others are dominated by non-native vegetation with few shrubs. Dominant species in this community include greasewood (*Sarcobatus vermiculatus*), iodine bush, saltbush (*Atriplex* spp.), wheatgrass (*Elymus* spp.), cheatgrass (*Bromus techtorus*), and bulbous bluegrass (*Poa bulbosa*).

Pasture habitats in this MA are generally dominated by wheatgrass species where naturally salt desert scrub habitats have been cleared of woody vegetation. Particularly disturbed patches are dominated by noxious and invasive species such as Russian knapweed (*Acroptilon repens*), Scotch thistle (*Onopordum acanthium*), field bindweed (*Convolvulus arvensis*), cheatgrass (*Bromus techtorus*), and whitetop (*Cardaria draba*).

Evaporative Basins (Mini–Great Salt Lake)

The Evaporative Basins MA is 234 acres in size and also lies within the historic floodplain of the Jordan River, adjacent to and north of the Riverine MA. Channels from the Riverine MA feed the depressional

basins of this area. Although the natural flooding pattern of the Jordan River has been eliminated, a majority of this site has experienced seasonal inundation in recent years as a result of back-flooding by the State Canal, which runs along the northern end of this MA at the Preserve boundary.

This MA is also located below 4,212 feet within the FEMA floodplain for the Great Salt Lake and was generally inundated when high lake levels occurred in the 1980s. After water recedes below this MA, the remaining water gradually evaporates from these shallow basins, resulting in a relatively saline environment. However, agricultural land use practices (such as draining shallow groundwater and irrigation) during the last 100 years and periodic back-flooding from the State Canal have flushed out salts and thus lowered soil salinity in the basins more than what might normally be expected.

Uplands and wetlands in the Evaporative Basins MA are distributed in patches. The same vegetation communities found in the Riverine MA also occur in this area: mudflat/pickleweed, hydric meadow, sedge/cattail, riparian, salt desert scrub, and pasture. Additionally, portions of this MA were classified as cropland; however, they currently may appear indistinguishable from pasture habitats.

Common plant species are similar to those in the Riverine MA, but the Evaporative Basins MA contains a greater portion of large, depressional wetland basins rather than narrow, sinuous channels found in the Riverine MA. Common reed, considered invasive, dominates parts of some basins.

Alkali Flats and Slope Wetlands (Upper Playas)

The Alkali Flats and Slope Wetlands MA is 823 acres in size and is located adjacent to and east of both the Riverine and Evaporative Basins MAs. This MA consists primarily of ancient lake-bottom depressions with alkaline soils and is located primarily above the FEMA floodplain elevation for the Great Salt Lake (4,212 feet). The Alkali Flats and Slope Wetlands MA provides habitat during times of high Great Salt Lake elevations. This MA has been degraded through the alteration of natural hydrology overgrazing, invasion of non-native vegetation, habitat fragmentation and the clearing of vegetation for dirt roads and other infrastructure. Several ditches and drains are located across this MA and appear to drain adjacent wetlands and lower the naturally shallow water table.

Salt desert scrub is the most common vegetation community of this MA, followed by mudflat/pickleweed and hydric meadow. Although common plant species include those listed for the Riverine MA, much of the scrub habitat is degraded and is now dominated by noxious or invasive species. Problem species include field bindweed, Russian knapweed, Scotch thistle, Canada thistle (*Cirsium arvense*), Dyer's woad (*Isatis tinctoris*), perennial pepperweed (*Lepedium latifolium*), kochia (*Kochia scoparia*), cheatgrass, and whitetop.

Most of the playas' alkali flats (mudflats) maintain populations of western seepweed (*Suaeda occidentalis*) rather than pickleweed; seepweed is more tolerant of the alkaline soils common to this MA. Salt grass and iodine bush are also common along playa fringes.

The hydric meadows in the upper playas and associated upland areas are similar to those in the floodplain area. Dominant vegetation consists of saltgrass, foxtail barley, little barley, and Baltic rush (*Juncus balticus*). A few of the wetter areas such as ditch banks have been invaded with poison hemlock (*Conium maculatum*) and purple loosestrife (*Lythrum salicaria*).

Wet Meadow – Corps Reference Wetland (HGM Wet Meadow)

The Wet Meadow – Corps Reference Wetland MA is 274 acres in size and is located adjacent to and north of the Alkali Flats and Slope Wetlands MA. This MA contains a reference wetland site for the Corps that was used to calibrate the models for the project's functional assessment. A major water source for this site was artificially supplied through irrigation diversions from artesian wells east located east of the site along Redwood Road; however, this water source has been discontinued with changes in land ownership outside the Preserve, where most areas are slated for residential development. The northwest portion of the MA lies within the Great Salt Lake FEMA floodplain.

Vegetation communities in this MA consist primarily of cropland, pasture, and hydric meadow. The uplands are generally disturbed and dominated by noxious or invasive species similar to those listed for the other MAs. The hydric meadows occur within depressions and slope areas and consist of vegetation that tolerates being inundated for a portion of the growing season. These species include Baltic rush, spike rush (*Eleocharis palustris*), and saltgrass that vary in their distribution depending on soil and groundwater salinities. There is one large, high-functioning hydric meadow complex in this MA that was selected as a

reference wetland. This complex is primarily vegetated by native sedges and rushes.

Farmington Bay (Northern Properties)

The Farmington Bay MA is 570 acres in size and extends from the northern end of the Wet Meadow MA through the remainder of the mitigation properties to the northern end of the Preserve in Farmington. Much of this MA lies below 4,212 feet and so is within the Great Salt Lake FEMA floodplain. Several streams intersect this MA, but they have largely been altered by channelization, diversions, and upstream detention. At peak flows, some streams may overtop their banks to provide supplemental hydrology, but shallow groundwater and precipitation are the primary sources of wetland hydrology.

In the Farmington Bay MA, emergent marsh and wet meadow wetlands are intermixed with old lake-bottom depressions that function as playas (mudflat/pickleweed). Upland communities are predominantly pasturelands with some cropland and salt desert scrub habitat.

Sedge/cattail communities in this MA contain plant species similar to those in other MAs; however, many areas are heavily invaded with common reed and cattail (*Typha latifolia*). Some hydric meadows are dominated by saltgrass and little barley, while other meadows are dominated by rushes, sedges, teasel (*Dipsacus fullonum*), and reed canary grass (*Phalaris arundinacae*).

Table 3-5 provides the 1997 baseline habitat areas for the entire Preserve according to vegetation cover type. Table 3-5 also provides habitat areas from 2004 habitat mapping.

Table 3-5. Wildlife Habitats in the Legacy Nature Preserve

	Habitat (acres)	
Wildlife Habitat Type	**1997**	**2004**
Wetland Complex/Riparian Habitats		
Hydric Meadow	393.6	474.1
Sedge/Cattail	144.1	119.2
Mudflat/Pickleweed	230.3	230.5
Open Water	53.0	53.2
Riparian	23.7	17.0
Total Wetland Complex/Riparian Habitat	*844.7*	*894.0*

Wildlife Habitat Type	Habitat (acres) 1997	2004
Upland Habitats		
Pasture	356.7	323.0
Cropland	223.5	223.2
Salt Desert Scrub	675.3	662.5
Total Upland Habitat	*1,255.5*	*1,208.7*
Developed Land	5.2	2.6

Wetland complex/riparian wildlife habitat is not synonymous with "jurisdictional wetlands" as defined in Draft Supplemental EIS Section 4.12, Wetlands. Wetland complex/riparian wildlife habitat includes jurisdictional areas as well as non-jurisdictional riparian areas and other mesic habitats. This difference is discussed in greater detail in Appendix B of the wildlife technical memorandum.

It is important to note that many wetland cover types change over time due to factors such as the successionary cycle associated with the ebb and flow of the Great Salt Lake, fluctuations in annual precipitation, and active management. Table 3-5 illustrates changes in distribution of cover types over a seven year period. Some of the changes in vegetation since 1997 are the result of its active management since 2001. For example, the amount of developed land has been reduced from 5.2 acres to 2.6 acres through removing fill material, structures, and debris. Other changes in habitat type are consistent with patterns of ecological succession (such as the conversion of areas classified as open water in 1997 to hydric meadow and sedge/cattail communities), whether natural or induced by human activities.

Currently, the Preserve contains nearly 900 acres of wetland complexes and riparian habitats that include areas delineated as jurisdictional wetlands and non-jurisdictional riparian areas. The Preserve also contains over 1,200 acres of upland habitat (croplands, pasture, and desert salt scrub habitats) and about 3 acres of developed land. Table 3-6 provides habitat acres from 2004 mapping for each of the five management areas. Figure 5A – C, Legacy Nature Preserve Management Areas and Wildlife Habitats, shows the 2004 habitat mapping within each management area.

Table 3-6. Wildlife Habitats in the Legacy Nature Preserve by Management Area

Wildlife Habitat Type	Habitat (acres)				
	Riverine	Evaporative Basins	Alkali Flats	Wet Meadow	Farmington Bay
Wetland Complex/Riparian Habitats					
Hydric Meadow	30.2	131.9	72.1	94.4	145.6
Sedge/Cattail	1.5	7.3	1.4	6.3	102.7
Mudflat/Pickleweed	18.8	39.9	63.8	37.7	70.3
Open Water	7.7	5.3	0.0	0.0	40.2
Riparian	4.5	8.5	0.0	0.0	4.0
Total Wetland Complex/Riparian Habitat	*62.7*	*192.9*	*137.3*	*138.4*	*362.8*
Upland Habitats					
Pasture	0	5.1	184.4	24.2	109.3
Cropland	0	0	90.0	60.6	72.6
Salt Desert Scrub	141.1	35.9	410.9	51.6	23.0
Total Upland Habitat	*141.1*	*41.0*	*685.3*	*136.0*	*204.9*
Developed Land	0.1	0.0	0.3	0.0	2.25

Wetland complex/riparian wildlife habitat is not synonymous with "jurisdictional wetlands" as defined in Section 4.12, *Wetlands*, of the SEIS. Wetland complex/riparian wildlife habitat includes jurisdictional areas as well as non-jurisdictional riparian areas and other mesic habitats. This difference is discussed in greater detail in Appendix B of the wildlife technical memorandum.

For management purposes, habitat data from 2004 mapping is provided by management area in Table 3-6 because the 2004 data most accurately represent existing conditions from which to manage each area. Although wetland habitats are most predominate within lower lying MAs (Riverine, Evaporative Basins, and Farmington Bay), each MA contains a diversity of habitats.

3.3.5 Present and Historic Uses of Mitigation Area

Historic uses of the mitigation area have been mostly agricultural with some recreational use. Agricultural practices have resulted in extensive alteration of natural hydrology, overgrazing, invasion of non-native vegetation, habitat fragmentation, and the clearing of vegetation for dirt roads and other infrastructure.

Before UDOT began acquiring these lands in 2001, about 60% to 70% of the entire Preserve was subject to livestock grazing (mostly cattle and horses). Other uses included croplands, a tannery farm, major utilities, all-terrain vehicle (ATV) use, hunting, and illegal dumping. All Preserve properties purchased by UDOT have since been managed to meet mitigation measures and increase the quality of wildlife habitat.

3.3.6 Present and Proposed Uses of All Adjacent Areas

The present uses of many areas adjacent to the Preserve are agricultural. However, many adjacent areas have been converted to urban land through residential and commercial development. Most currently developed lands and planned developments are located east of the Preserve and proposed Legacy Parkway. Most of the adjacent lands west of the Preserve are protected for the benefit of wildlife and recreation. These areas include privately owned lands managed by several duck clubs, and the Farmington Bay Waterfowl Management Area, which is managed by the Utah Division of Wildlife Resources. Figure 4, Protected Areas, shows the location of protected areas near the Preserve.

According to growth projections (see Section 4.1, Land Use, in the Supplemental EIS), by 2020 about 36% of Preserve wildlife habitats will be adjacent to high population densities, and a majority of habitats will be near high to moderate population densities. The Preserve provides a large enough area of contiguous wildlife habitat to remain viable despite its proximity to expected population growth.

3.4 Mitigation Goals and Objectives

Some preservation and enhancement/restoration mitigation goals are applicable to the entire Preserve, while other specific goals have been developed for each Preserve MA. Both overall and area specific goals are addressed in the following sections of this plan.

3.4.1 Overall Restoration Implementation Measures

Implementation measures to restore and protect wetlands and wildlife habitat on the Preserve were initiated in 2001. This section provides an overview of these measures. For further information, refer to previous Preserve mitigation planning documents (described in Section 1.0, Introduction) and the 404 permit annual status reports.

Many implementation measures are applicable to the entire 2,100-acre Preserve. These measures include:

- **Acquire land.** UDOT is in the process of purchasing the entire 2,100-acre Preserve in fee title and deed restricted to protect all mitigation lands in perpetuity. All water rights appurtenant to the property would also be acquired.

- **Selectively fence the perimeter of Preserve properties.** This measure would reduce disturbance to wetland habitats and wildlife and deter trespassing by humans and livestock.
- **Remove interior fences within Preserve properties.** Barbed-wire fencing that has been common throughout the Preserve for many years. Several species of birds have been found ensnared in this type of fencing. Removing fences would benefit wildlife by removing barriers to movement.
- **Restrict or eliminate livestock grazing on the Preserve.** This measure would protect wildlife and their habitat. However, the use of controlled grazing as a tool to manage vegetation would remain an option subject to approval by the Corps.
- **Remove roads not required for management of the Preserve.** Dirt roads developed through the Preserve have reduced habitat connectivity, degraded wetland hydrology, and provided openings for the introduction and spread of invasive plants. Roads not needed for management activities would be closed and the footprint reclaimed and/or reseeded with native vegetation. Vehicle access on the Preserve would be limited to defined routes for approved management activities only.
- **Fill in abandoned and unused drainage ditches.** This measure would extend the wet period for Preserve wetlands by raising the water table without adversely affecting the drainage needs of local property owners. Additionally, tile drains or other subterranean drainage features identified would be plugged.
- **Remove trash, debris, illegal fills, etc.** Years of illegal dumping have littered many areas of the Preserve with trash and debris. This measure would clean up and restore both wetland and upland habitats, while removing disturbed areas.
- **Remove structures.** All structures would be removed from mitigation properties unless determined to be useful and appropriate for management of the Preserve.
- **Relocate utilities.** Several major utilities have historically been located through the Preserve. All utilities would be removed from the Preserve to the extent practicable as determined by UDOT and the Corps. Easements with appropriate access and use restrictions would be developed for any remaining utilities.

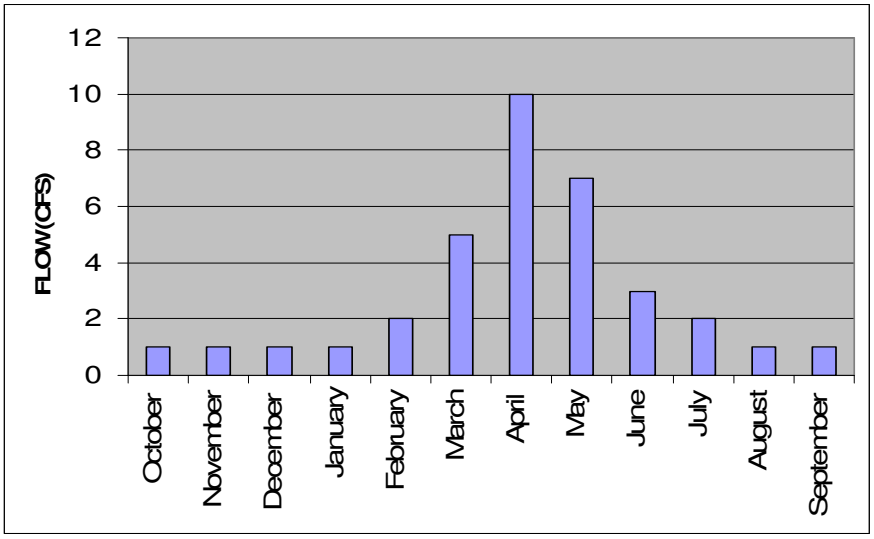
3.4.2 Active / Area Specific Restoration Measures

As presented in Table 3-2, 189 acres of jurisdictional wetlands in the Preserve would be subject to active restoration measures. Active measures applicable to specific management areas are presented in the following sections.

Riverine (Mini–Jordan River)

The overall goal for this MA is to restore a hydrologic connection to the historic Jordan River floodplain and provide perennial flows in a relic Jordan River floodplain channel with meanders and oxbows. The relic channel meander is often referred to as the "Mini-Jordan" within this MA. The main water source for the relic channel (Mini-Jordan) is from North Canyon and Hooper's Draw with supplemental water from the Jordan River. This drainage previously flowed under the Jordan River directly to the Great Salt Lake. Figure 6, Hydrology Measures, provides the location of the Min-Jordan, its inlet from the Jordan River ("Mini-Jordan Inlet"), the North Canyon conveyance, elevation contours, and water control structures.

The hydrograph of North Canyon is typical to that from mountainous areas along the Wasatch front with peak flows in the spring months and tapering off to a base flow of 1 to 2 cubic feet per second (cfs) in late summer and early fall months. UDOT has acquired the water right to up to 20 cfs from this source. A characteristic hydrograph is presented below.



As depicted in Figure 6, water enters the Mini-Jordan from either the North Canyon channel or Jordan River. Water control structures (screw gates) are located at both inflows and can be used to allow or eliminate flows from either source. After entering the Min-Jordan, water meanders northwesterly through

this channel, until exiting through water control structures, either at the Jordan River or at the Riverine MA boundary with Evaporative Basin MA. The depth of the water within the MA can be controlled at the Jordan River outlet (white square on Jordan River in Figure 6), which is an adjustable weir (or stop log) structure to maximize management flexibility. The depth of water in the Min-Jordan channel can vary from about 6 inches to about 4 feet by restricting flows through the Jordan River outlet, allowing water to fill up within the Mini-Jordan channel. The optimal water depth during various times of the year will be determined through the adaptive management period.

The majority of this MA lies within the 100-year FEMA floodplain designation for the Great Salt Lake (4,212 feet) and is thereby subject to inundation from the Great Salt Lake when the lake approaches historically high water levels. The act of filling the ditches located in the Alkali Flats & Slope Wetlands MA may cause the ground water levels to rise which will recharge in the Riverine MA.

Implementation measures include:

- Install water delivery system to convey water from North Canyon and construct water control structures to restore floodplain hydrology and manage flow rates.
- Minimally modify "Mini–Jordan River" channels and hydraulically connect it to the Jordan River.
- Create an island for nesting shorebirds within a channel oxbow.
- Acquire water rights for external water sources.
- Characterize the water quality of external water sources. Water quality must meet numerical criteria for beneficial use classification 3D: protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain (U.A.C. Rule R317-2-6).
- Develop and implement a comprehensive water management plan for the Jordan River floodplain. (Note that this measure also pertains to the Evaporative Basins MA.)

Evaporative Basins (Mini–Great Salt Lake)

The absence of periodic flooding by the lake or other natural hydraulic influences has fostered a shift in vegetative species composition away from barren or partial pickleweed vegetated mudflats because salts are not collecting on surface soils through evaporative and capillary processes.

To restore a hydrologic connection to the Jordan River floodplain, periodic flooding of the terminal basins will occur in the Evaporative Basins MA. The flooding will restore habitat for migratory and resident shore birds in basins that still contain salts and are relatively vegetation free or partially covered with pickleweed. By wetting the soils during the early spring and allowing the water to evaporate, macroinvertebrate communities will become established along the edge of the wetted soil and receding water serving as an important food base for the birds. The other basins in the floodplain may need restoration as their soil salinities are low and organic soils have accumulated.

As depicted in Figure 6, an adjustable weir (or stop log) water control structure in located at the boundary between the Riverine MA and Evaporative Basins MA (white square in Figure 6). This structure can allow or eliminate flows from the Mini-Jordan channel in the Riverine MA to continue along old meander channels into the Evaporative Basins MA. With more detailed investigation of the natural topography, up to four additional small water control structures which minimally modify the site, may be added to control the flows from the old meander channel into several basins. These water control structures will allow hydrological isolation, if desired, to six of the larger terminal basins within the MA. Control structures have been chosen with the objective of being able to carefully control any water introduced and to prevent water from overflowing the basins so salts are not carried out of the basins and redistributed, but remain within the basins and are deposited through evaporation. These structures will also allow water to bypass the basin if periods of dryness are desired. The goal is to retain the saline nature of the basins to help control vegetation and maintain areas of open mudflats. Figure 6 shows the inundated areas at different elevations to show variability available to the site manager.

Three small culverts are also planned along the eastern levee of the Jordan River. These structures will be utilized during times of high water in the Jordan River (refer to Figure 6). This gives a second option for delivering water from the Jordan River directly into several basins and can help to meet the objective of limiting undesired salt redistribution among the evaporative basins. Mitigation activities for the Evaporative Basins MA are summarized below:

- Install water control structures to divert water and control flows from the Riverine MA and from the Jordan River.
- Install a low berm at the northern boundary to prevent back-flooding and receding waters from the State Canal.
- Develop and implement a comprehensive water management plan that outlines flow measurement procedures the resulting affects on vegetation, water quality and soil chemistry.

Alkali Flats and Slope Wetlands (Upper Playas)

This area primarily consists of ancient lake-bottom depressions with alkaline soils interspersed among uplands. The Alkali Flats and Slope Wetlands MA has been degraded through the alteration of natural hydrology, overgrazing, invasion of non-native vegetation, habitat fragmentation, and the clearing of vegetation for development of dirt roads and other infrastructure.

Five potential sites within uplands in this MA have been identified, based on topography and existing habitat type (uplands), for wetlands creation (See Figure 6). The implementation measures specific to this MA are:

- Drill artesian wells to provide hydrology for the creation of 12 acres of groundwater slope wetlands. Two wells are currently proposed. These wells will have a valve to control the flow of water. A structure may also be required to ensure the flow of water is dispersed over a large area and does not channelize. Any excavation and berming will be minimized and avoided if possible, but a small berm may be required to detain water and control surface flows from entering adjacent MAs.
- Backfill three unused ditches in an effort to restore natural hydrolgy.
- Remove unnecessary roads.

Wet Meadow – Corps Reference Wetland (HGM Wet Meadow)

In addition to groundwater, wet meadows in this MA have been hydrologically supplemented with irrigation water that originated from wells located east of the Preserve. However, developers have purchased lands to the east of the Preserve, and irrigation flows have stopped. Therefore, the implementation measure specific to this MA is:

- Provide adequate hydrology to sustain wet meadow wetlands at a high-functioning level. The option proposed to accomplish this objective is to drill 3 new wells in the Preserve. In conjunction, UDOT will acquire the water rights that are appurtenant to the Preserve property, including well rights located to east of the Preserve. It is anticipated that the new well locations (with control valves) will be placed and managed to effectively mimic previous hydrologic patterns without modifying (excavation or berming) the landscape.

Farmington Bay

This management area provides a buffer to Farmington Bay and protects important wetland habitat in the bay area. Trash and debris have been removed from two locations and disturbed land was re-contoured to match the surrounding

topography. Ideally, the management approach for this area will be relatively hands-off aside from noxious weed control, letting restoration occur naturally.

3.4.3 Implementation Schedule and Current Status

The 2001 addendum mitigation plan provided a 3-year schedule for implementation measures. This schedule was designed with the intention of completing implementation measures concurrently with construction of the Legacy Parkway. However, in November 2001, construction of the Legacy Parkway was halted when the project was placed under a legal injunction. Nevertheless, UDOT decided to continue implementing mitigation measures on the Preserve. Some property acquisitions have been delayed by the legal process, but UDOT intends to complete all implementation measures by the end of 2006. Table 3- provides a status summary for implementation measures. Annual 404 permit status reports provide more detailed information.

Table 3-7. Summary of Legacy Nature Preserve Implementation Measures

Implementation Measure	As of August 2005	To Be Completed
Acquire land	UDOT has purchased about 90% of the 2,100 acres.	UDOT is pursuing all remaining properties via eminent domain.
Remove roads	Over 8,000 linear feet of dirt roads have been removed and revegetated, resulting in the conversion of these areas to 2.3 acres of improved wildlife habitats and adjacent habitat connectivity.	Over 31,000 linear feet of roads in the Preserve remain that are slated for removal (estimated 3.4 acres).
Remove fill, debris, and structures	Over 3,000 dump truck loads of debris and fill material have been removed (over 900 tires, extensive cement piles, five car frames); 5 large structures removed.	Additional areas containing fill and debris have been identified for future cleanup.
Fill in drainage ditches	To restore the natural water table, over 18,000 linear feet of ditches have been filled in with spoils contoured back to the natural topography.	Only a few smaller sections of ditches remain.
Remove internal fences	80% of the 6,800 linear feet of fences within the Preserve have been removed.	About 1,200 linear feet of internal fences still need to be removed.
Install perimeter fence	About 70% of the Preserve perimeter fencing has been installed to reduce human disturbance.	The perimeter of remaining accessible Preserve areas will be fenced (where not adjacent to other protected areas).
End livestock grazing	60% to 70% of the 2,100-acre Preserve was previously subject to grazing. All traditional livestock grazing has been terminated and is prohibited.	Completed. Controlled grazing may be considered for managing habitat.
Remove structures	All major structures have been removed except for the building on 900 North that is approved to remain as a maintenance shed.	A few minor structures remain that are slated for removal.
Relocate utilities	Two major utility lines have been relocated outside the Preserve.	Coordination is ongoing with PacifiCorp to minimize wildlife disturbance.

Implementation Measure	As of August 2005	To Be Completed
Restore hydrology	Extensive restoration activities for the Jordan River floodplain and adjacent areas have been completed, including designing and constructing a water delivery and control system, obtaining water rights, and filling in ditches and drains.	Develop and implement adaptive water management plan in order to manage Preserve hydrology to benefit wildlife.
Install water control structures	The water delivery system has been designed and all major control structures have been constructed and installed.	A few minor control structures need to be installed to effectively deliver and manage water to the evaporative basins.
Create island	Complete; refer to 2003 annual 404 permit status report.	Completed.
Acquire water rights	Most water rights that will provide sufficient hydrology to the Jordan River floodplain have been acquired; these include water from North Canyon and the Jordan River.	UDOT water rights attorney continues to work on investigating and procuring potential water rights.
Characterize water quality of external water sources	Complete; refer to 2004 annual 404 permit status report.	Completed.
Install low berm	Construction of the berm adjacent to the State Canal was completed in January 2005.	Completed.
Drill wells	Potential sites for wells pertaining to wetlands creation have been identified; well water rights have been investigated to sustain reference area wet meadows.	All wells determined necessary for mitigation still need to be drilled.
Develop and implement water management plan	This plan has not yet been developed; it will be included in adaptive management planning by the CDT.	Develop and implement plan.

3.4.4 Adaptive Management and Monitoring

The 2001 404 permit outlines that, when the implementation measures are completed, Adaptive Management and Monitoring would follow for a minimum of 5 years until the Corps determines the mitigation to be fully functional. During the Adaptive Management and Monitoring phase, the following items would be evaluated:

- Timing, duration, and depth of water in depressional wetlands
- Water flow through the main southern channel (mini-Jordan)
- Timing, duration, and location of periods of evaporation and dryness
- Changes in location of water that could require minimal earth movement
- Annual bird and vegetation monitoring activities

The 404 permit also requires UDOT to provide a site manager to help evaluate the performance of implementation measures and to perform the following activities:

- Inspect and maintain in good condition all aspects of the mitigation site including diversion structures, channels, berm, maintenance roads, fences, and signs.
- Keep water courses free from flow-impeding debris.
- Inspect water conveyances (channels, inlet/outlet structures) for undesirable erosion.
- Survey and map noxious and invasive weeds.
- Develop and implement methods for controlling noxious weeds and invasive species and implement plans for revegetating these areas with desirable species.
- Develop water quality guidelines for adjacent developments.

Not all overall restoration or area specific implementation measures have been completed; nevertheless, UDOT hired a site manager for the Preserve in 2004. Several Adaptive Management and Monitoring activities have been initiated such as regular inspections and noxious and invasive weed surveys, mapping, and control.

Collaborative Design Team

As mentioned earlier, in January 2005, UDOT established a Collaborative Design Team (CDT) to provide recommendations to the Corps for adaptive and long-term management options for the Preserve. To provide diverse expertise and a regional perspective for wildlife management, this team includes the following resource agencies, environmental groups, and other stakeholders:

- Friends of Great Salt Lake
- The Nature Conservancy
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- Environmental Protection Agency – Region 8
- Utah Division of Wildlife Resources
- Utah Department of Transportation
- Great Salt Lake Keeper
- Foundation for the Provo-Jordan River Parkway
- Bear River Bird Refuge
- Farmington Bay Waterfowl Management Area

Adaptive Management Plan

Currently, the CDT is developing an adaptive management plan for the Preserve. This management plan will include specific management objectives and success criteria for each MA. The CDT will also help create a comprehensive water management plan which will guide monitoring activities throughout the adaptive management period to set operational procedures for long term management. This section provides an overview of components of the adaptive management plan *as drafted in September 2005*. Note that all of this information is subject to change as this dynamic plan is further developed and updated. The adaptive management plan is under development and a final draft will be published and be made available upon request.

Mission Statement

> *"The Legacy Nature Preserve provides in perpetuity quality wildlife habitats for the purpose of mitigating impacts to wetlands and wildlife associated with the Legacy Parkway."*

Guiding Principles

The Preserve will use a scientifically based adaptive management approach to:

1. Meet all mitigation requirements detailed in the Supplemental EIS Mitigation Plan and Section 404 Permit.
2. Protect, preserve, and enhance aquatic and aquatic-dependent resources on the LNP.
3. Protect, preserve, and enhance habitat for Utah State Species of Concern in the LNP.
4. Protect, preserve, and mitigate any cultural resources on the LNP.
5. Restore functional habitat for wildlife that is consistent with ecological potential and management capabilities.
6. Monitor and manage invasive species to protect and preserve desirable native or naturalized species from deleterious effects.
7. Coordinate LNP adaptive management strategies with adjacent managed areas and land uses to protect in perpetuity, improve, and enhance the LNP overall habitat integrity of the Great Salt Lake ecosystem.
8. Be proactive in the greater community to prevent impacts from external threats that would compromise the integrity of the LNP.

9. Provide opportunities for public education and outreach compatible with Guiding Principles 1-8 that enhance the visibility and image of the LNP, develop and maintain a sense of public stewardship, and create a better appreciation and awareness of the Great Salt Lake ecosystem.
10. Prohibit active recreation on the LNP.

Riverine MA (Mini–Jordan River) Management Objectives

- Protect and enhance water quality.
- Ensure adequate quantity of water is available to meet Riverine MA objectives.
- Protect, maintain, and enhance the Sorenson Slough as a riparian area to benefit riparian-dependent wildlife.
- Minimize pesticide applications on the MA.
- Protect the Archaeological site.

Evaporative Basins MA (Mini–Great Salt Lake) Management Objectives

- Protect and enhance water quality.
- Ensure adequate quantity of water is available to meet Evaporative Basins MA objectives.
- Provide dynamic habitat for shorebirds.
- Minimize pesticide applications on the MA.

Alkali Flats and Slope Wetlands MA (Upper Playas) Management Objectives

- Protect and enhance water quality.
- Ensure adequate quantity of water is available to meet Alkali Flats and Slope Wetlands MA objectives.
- Create and maintain at least 12 acres of new groundwater-slope wetlands.
- Improve upland and wetland habitat.
- Minimize pesticide applications on the MA.
- Protect the Archaeological site.

Wet Meadow MA – Corps Reference Wetland (HGM Wet Meadow) Management Objectives

- Protect and enhance water quality.
- Ensure adequate quantity of water is available to meet MA objectives.
- Improve wetland and upland habitat.
- Minimize pesticide applications on the MA.

Farmington Bay MA Management Objectives

- Protect and enhance water quality.
- Ensure adequate quantity of water is available to meet MA objectives.
- Maintain wetland and upland habitat for shorebird and grassland-nesting birds.
- Minimize pesticide applications on the MA.
- Protect the Archaeological sites.

LNP Education Management Objectives

- Develop a unique educational message for the LNP.
- Provide a range of educational opportunities.
- Control the flow of humans in and around the LNP.
- Provide year-round opportunities with seasonal considerations.
- Allow research projects in specified areas within the LNP, as needed.
- Establish a long-term oversight group to oversee the education program.

3.4.5 Long-Term Management

When UDOT believes that the Preserve mitigation is fully functional in accordance with monitoring and success criteria, a proposed final report will be submitted to the Corps. The Corps will then confirm the successful completion of the mitigation obligation or require additional years of monitoring.

When UDOT receives written notice of approval from the Corps, UDOT will make a decision to either retain management of the Preserve or seek to transfer the Preserve to an acceptable third party or parties. UDOT will provide an endowment to ensure financial resources to fulfill Corps requirements for preserving the wetland functions in perpetuity. Hence, UDOT will keep records

of management and maintenance costs to help determine the endowment required to fund management and maintenance in perpetuity.

Long-Term Management Plan

The adaptive management plan being developed with the CDT is intended to be a dynamic "living document" that would be revised according to monitoring results based on the iterative principles of adaptive management. After completion of the Adaptive Management and Monitoring phase, the adaptive management plan would be revisited and amended to serve as a long-term management plan for the Preserve. This plan will identify the long-term resource manager and site protection measures. The plan will also describe any proposed grazing, fencing, fire-management activities, provisions for public access, noxious/invasive plant control programs (if applicable), annual reporting, and any other proposed activities.

3.5 Success Criteria

This section presents the success criteria for fulfilling the mitigation requirements for Implementation Measures (Overall Restoration and Active restoration) and Adaptive Management and Monitoring Requirements.

3.5.1 Overall Restoration Implementation Measures

The success of the overall restoration implementation measures will consist of physically completing these measures. As described in Section 3.4.1, these measures include:

- Acquire land (mostly complete)
- Install perimeter fence, gates, and signs (mostly complete)
- Remove livestock (complete)
- Remove trash, debris, illegal fills, etc. (complete for main areas identified)
- Remove interior fences (mostly complete)
- Remove structures (mostly complete)
- Install water control structures (mostly complete)
- Install low berm (complete)
- Modify riverine channels to connect to Jordan River (complete)
- Remove unnecessary roads (partly complete)

- Fill in unnecessary ditches (mostly complete)
- Characterize water quality (baseline complete)
- Develop and implement water management plan (in progress)
- Drill two artesian wells to create slope wetlands (incomplete)

3.5.2 Adaptive Management and Monitoring

The following success criteria are provided to guide successful establishment of mitigation goals within each MA. The CDT might propose changes to existing criteria and establish additional success criteria for each of the five Preserve MAs.

Riverine (Mini–Jordan River)

Vegetation Success Criteria

- Maintain existing native plant species. Target species for the channel meander include alkali bulrush (*Scirpus maritimus*), hardstem bulrush (*Scirpus acutus*), and native aquatic vegetation. Target species along the continuum of hydric meadow and playa wetlands include, pickleweed (*Salicornia europaea*), iodine bush (*Allenrolfea occidentalis*), and saltgrass (*Distichlis spicata*). Desirable riparian species along the Jordan River include coyote willow (*Salix exigua*) and fremont cottonwood (*Populus fremontii*).
- Control noxious / invasive species. Target species for control in this management area include Russian knapweed (*Acroptilon repens*), Scotch thistle (*Onopordum acanthium*), field bindweed (*Convolvulus arvensis*), and hoary cress (*Cardaria draba*) among uplands and common reed (*Phragmites australis*) within the channel meander.

Hydrology Success Criteria

- Actively restore a portion of the Jordan River floodplain by providing adequate water flow to mimic a natural Jordan River tributary and floodplain. Water rights and the delivery system will be sufficient to enable year-round flows to the channel meander during normal climatic conditions. Channel water depth may range from approximately 6 inches to 4 feet.

Evaporative Basins (Mini–Great Salt Lake)

Vegetation Success Criteria

- Maintain existing native species diversity within a range of +/- 25 percent to provide dynamic habitat for shorebirds. Pickleweed (*Salicornia pp.*) is the primary target species for the most saline evaporative basins. Existing native woody riparian species will be maintained and managed for along the Jordan River.
- Control noxious / invasive species. Common reed (*Phragmites australis*) is the primary target species within wetlands.

Hydrology Success Criteria

- Provide appropriate emphemeral water supply to evaporative basins Mitigation activities in the Evaporative Basins to maintain the diverse habitats that provide foraging, resting, and nesting areas.

Alkali Flats and Slope Wetlands (Upper Playas)

Vegetation Success Criteria

- Maintain existing native vegetation along the continuum of hydric meadows and alkali flats. Target species include western seepweed (*Suaeda occidentalis*), iodine bush (*Allenrolfea occidentalis*) and saltgrass (*Distichlis spicata*).
- Control noxious / invasive species. Target species include field bindweed, Russian knapweed, Scotch thistle, Canada thistle (*Cirsium arvense*), Dyer's woad (*Isatis tinctoris*), perennial pepperweed (*Lepedium latifolium*), kochia (*Kochia scoparia*), and hoary cress.

Hydrology Success Criteria

- Acquire sufficient water rights to protect water appurtenant to this management area.
- Enhance existing groundwater hydrology by filling in designated ditches and plugging tile trains.
- Drill wells in existing uplands to obtain sufficient artesian flow to develop and maintain approximately 12 acres of slope wetlands.

Wet Meadow – Corps Reference Wetland (HGM Wet Meadow)

Vegetation Success Criteria

- Maintain the native vegetative composition of the wet meadow complex. Dominant target species include native grasses, sedges and rushes such wiregrass (*Juncus balticus*), Nuttail's alkali grass (*Pucinellia nuttailiana*), sedge mouse-tail (*Myosurus aristatus*), and creeping spikerush (*Eleocharis palustris*).
- Control noxious / invasive species. Hoary cress is the primary target species for control.

Hydrology Success Criteria

- Secure sufficient water rights to protect water appurtenant to this management area.
- Restore historic supplemental hydrology (cut off by housing development), sufficient to maintain a high-functioning seasonal/semi-perminent freshwater wetland complex.

Farmington Bay (Northern Properties)

Vegetation Success Criteria

- Maintain existing diversity of native vegetation among the sedge/cattail, hydric meadow, and mudflat/pickleweed communities. For sedge/cattail communities, target species include alkali bulrush (*Scirpus maritimus*) and hardstem bulrush (*Scirpus acutus*). Target species along the hydric meadow / playa continuum include pickleweed, saltgrass and wiregrass.
- Control noxious / invasive species. Common reed (*Phragmites australis*) is the primary target species within marsh wetlands.

Hydrology Success Criteria

- Maintain existing hydrology by securing sufficient water rights to protect water appurtenant to this management area.

3.6 Monitoring and Reporting Requirements

This section presents current monitoring and reporting requirements for Preserve mitigation as approved by the Corps. Additional monitoring requirements will be developed by the CDT and incorporated into the adaptive management plan.

3.6.1 Vegetation and Bird Monitoring

Baseline surveys for plants and avifauna began in 1999 and will continue until implementation of the mitigation plan is completed. Post-implementation biological surveys will continue for 5 years after the mitigation enhancements have been completed. Surveys will be performed using the same methods and following the same schedule as the baseline studies.

A dominant vegetation map for the Jordan River Floodplain will be produced from annual aerial photographs taken in July of each year, beginning in 2000 and continuing through 5 years after implementation.

3.6.2 Reporting Requirements

Annual reports on the status of completing the implementation of the mitigation plan are required during implementation and for 5 years following completion of implementation measures. The annual report will be distributed to EPA, Corps, USFWS, and the Utah Division of Wildlife Resources. After 5 years of monitoring, the Corps will determine the frequency of future monitoring and reporting. Annual reports on the bird and vegetation surveys are also required to be submitted to the Corps, EPA, USFWS, and the Division of Wildlife Resources.

All annual reports have been completed and submitted as required through 2004.

4.0 References

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Figure 4-1. Site Location Map

Figure 4-2. Legacy Nature Preserve

Figure 4-3. Legacy Nature Preserve Management Areas

Figure 4-4. Legacy Nature Preserve Protected Areas

Figure 4-5. Legacy Nature Preserve Management Areas and Wildlife Habitat

Figure 4-6. Hydrology Measures}